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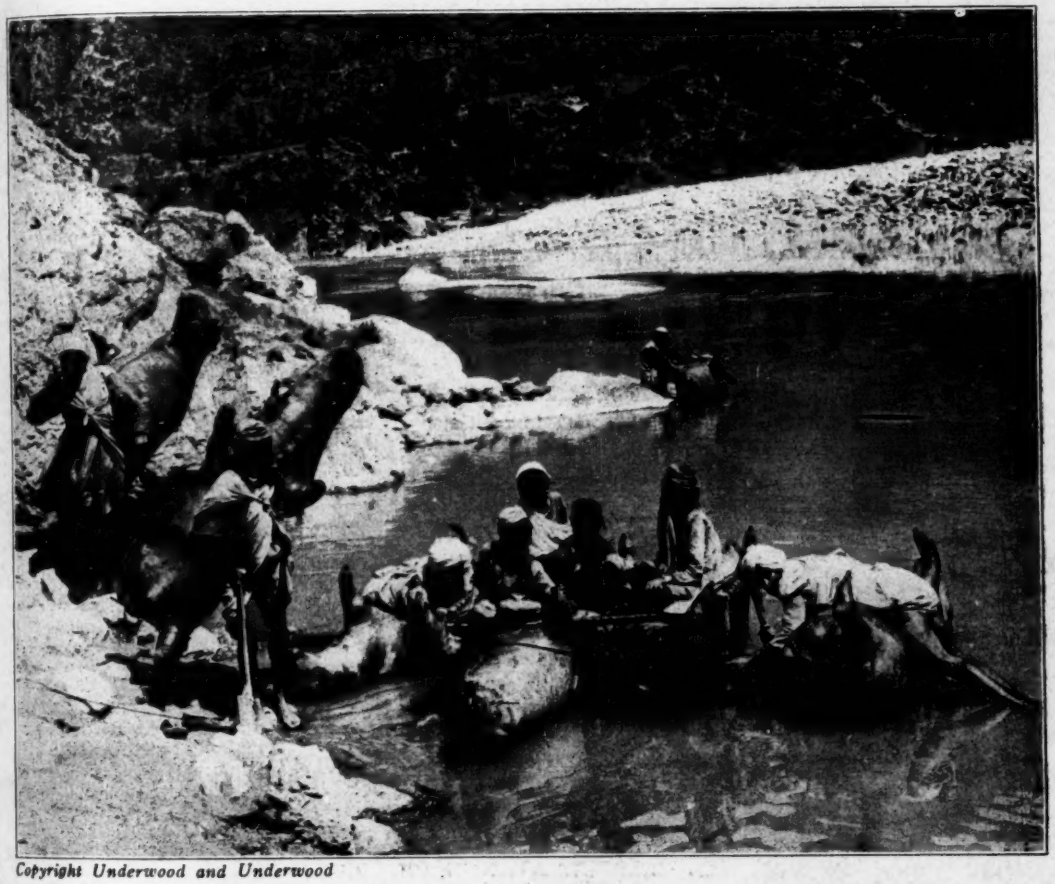

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Inflated bullock skins used in parts of India as boats and rafts

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LAKE WAKATIPU AND THE REMARKABLES

WALDO S. GLOCK
Ohio State University

Queenstown and The Remarkables! Where in New Zealand, where over the rest of the earth, has nature chosen to favor man with such a spell of beauty? Here the imaginary realms of a dreamer; here the wonderland of youthful romance! Lake Wakatipu in its flowing curves maintains the delicate perfection of Lake Louise, Canada; the distances, the rugged heights, impress the feeling of awe, of immensity, of grandeur, held so strikingly by the Grand Canyon of the Colorado. The human mind marvels in awe and admiration before the marvelous workmanship.

UNDER THE MOONLIGHT

As the shadows of evening came into their fullness we stood on the glacial moraine blocking the mountain-girt valley. To the rear lay the brown stretches of the Waimea Plains blending upward into the rounded slopes of the foothills which, as spurs, buttressed the forest of peaks behind. Ahead spread the smooth surface of Lake Wakatipu, a mirror from wall to wall, mountain-bound and silent.

After dinner on the lake boat we warmed ourselves about the smokestack, watching the dark misty mountains and listening to the swish of the waters as the small prow nuzzled them aside. The busy world lay far behind; slowly our minds eased thru the transition from the drab and ordinary to the sparkling new and the unexpected. Modestly, without any warning, a soft light spread over all—a glow out of the young night scarcely begun. And there in the east a great moon, bright and gibbous, swung clear of the angular, elevated horizon. As the boat moved up the lake the bright satellite played tag with the jagged teeth of that incomparable range, The Remarkables, a solid mass riven with age, impenetrably black against the soft yielding light of night. The

N. Z. Government Publicity Photo

FIG. 1. Lake Wakatipu, New Zealand

spangled face of the moon dodged behind a giant prong only to shake itself free the next moment and shine so bright and near that the depth and curve of the sphere became surprisingly real. The silver shimmering carpet reaching all the way on the water to the utter black of the mountain wall; the jagged crown of teeth, and, above, the great moon bobbing along in the soft night sky: a glorious hour of sublime majesty held us spellbound in a feeling of genuine awe. Had other people ever gazed on such a sight? What emotions awoke, stirred, and blazed forth in the more savage breasts of long ago! And yet several times in the remote past the waves of the sea rolled unmolested over this very scene—in the geological past when the Southern Alps were yet to be born! Truly the beauty of Lake Wakatipu is of the present only, for in the yesterday of time long icy tongues, ponderous and stubborn, crept here and there, rasping great holes in the solid rocks at some places, choking valleys and stream ways at others.

The splendor of burnished snow, of exalted moonlight, of kindly sunshine, of moaning forest, of broad brown rolling slopes, of smooth glassy lakes that reflected the heaven's own blue, of swaying palm—the sublime majesty of mountains, valleys, and of endless distance—these we beheld, marveled at, one glorious day, one wonderful night.

Surely it would be an injustice to attempt a profound description of Lake Wakatipu, of Queenstown and The Remarkables. Jottings, like the pulsing in the flood of emotions, must suffice.

Settled at last in one of the hospitable hotels of Queenstown we slipped out expectantly to the long arm, The Domain, protruding into the now slightly wind-ruffled waters of Lake Wakatipu. The moon with shadowy patches on its surface blazed in the sky and lighted the whole world with a diffused glow of soft dull white. A group of trees, a shrub, a bench, a rustic bridge—each gave a new setting to mountain slope, peak, and yawning valley. Only our eyes registered. Thru the tall dark swaying pines the extraordinary moonlight embossed a towering triangular peak solitary in the realms of the sky, darkened to a golden glow flecked by the black of forest patch on the uncrowned peak below, and shown forth almost dazzling bright, a scintillating wonder of burnished silver and shadowy white, on the long rugged ridge that held itself so high, so lone, and self-complete. Over a thick carpet of pine needles and thru haunting shadows that moved fitfully below the

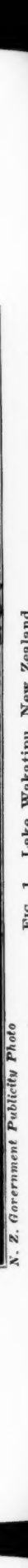

FIG. 1. Lake Wakatipu, New Zealand

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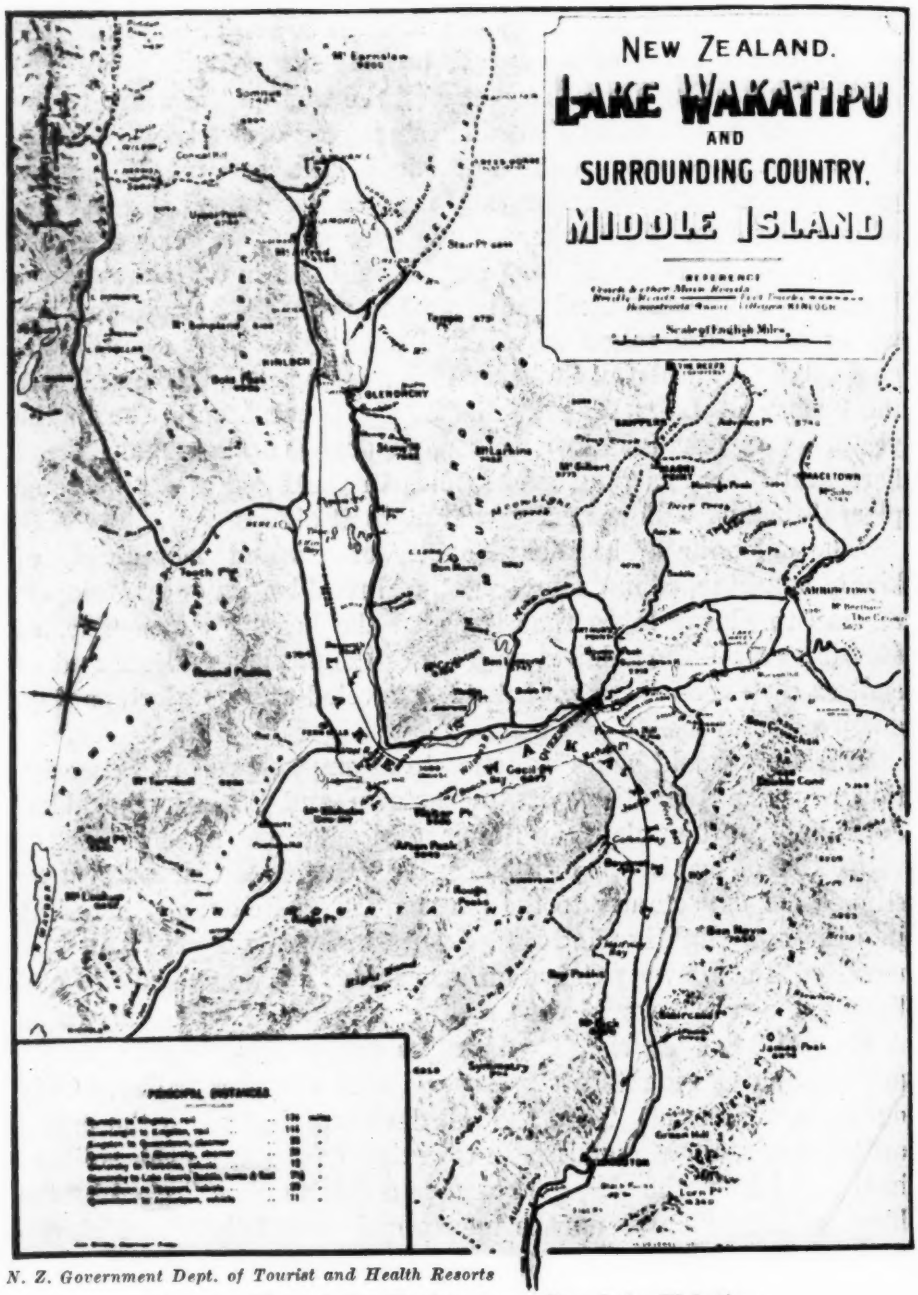

N. Z. Government Dept. of Tourist and Health Resorts

FIG. 2. Map of the district surrounding Lake Wakatipu

trees we crossed to the moon's own side of The Domain. Midway reposed the giant glacial boulder of schist studded by the tablets commemorative to Captain R. F. Scott whose heroic deeds and vibrant account of the comrade who crawled away to die harmonized dramatically with the world about us. A small central lagoon, glassy and black, reflected dimly the trees and palms, a stray cloud, and very faintly a snow-crested peak. Streams of light flickered on the water of Frankton Inlet. Over the way black against the eastern sky loomed the great bulk of The Remarkables, jagged, ominous, aloof in unassailable primeval seclusion. Rising nearly sheer from the water line far upward to the last thin needle of the serrate edge, the sullen unified mountain mass fought stubbornly the persistent attacks of the weather that already had seamed and riven the rocky walls into a fretwork of lines and figures.

Such unsuspected beauty hidden in far away New Zealand! It was not a supernatural beauty enshrouded by mystery of the past, but a living wonder of the present. Thru fear of having missed something or thru hunger for more views of the surroundings we sat on a shaded bench. There came to us the moan of the wind in the pines, the drawn-out sigh of the cedars and firs, the tinkle of the scimitar-like leaves of the eucalypti, the swish of the waves on the shore, and momentarily the sheen of beaten silver from the towering summits above.

As we climbed a rise back of Queenstown it seemed as if we had departed from the lake world below and had crawled up where we could touch the hem of the garments hanging down from the monarchs in the sky. The dark even surface of the lake shimmered within its girdle of mountains. A soft diffused glow, fairylike, almost unreal, dark yet lighting all, touched ever so mildly the shadowy slopes not covered by a veil of snow. The higher slopes and the lone summits themselves shone with a mercuric luster, softly metallic and brilliant under the rays of an approaching moon. The time, the setting, and the feeble light that lent distance gave the encircling mountains, isolated in space, an aspect truly regal, even sublime, as they slumbered under their mantles of white the sleep of the fleeting centuries.

More distant, more self-contained, more mysterious than ever, loomed The Remarkables. Southward down the lake the broad shoulders of Cecil Peak sprang boldly from the black waters; farther in the dimness of the night the pinnacle of Walter Peak

Courtesy of the N. Z. Geological Survey

FIG. 3. Lake Wakatipu and The Remarkables, looking southeastward. Clouds mask a portion of the rugged unglaciated Remarkables. The southern part of The Remarkables shows the rounded slopes induced by intense ice erosion that operated to an elevation of 6500 feet. Ice movement was from right to left in the vicinity of Queenstown. The grooved surface of Peninsula Hill, which rises at the left between Queenstown and The Remarkables, resulted from profound glacial scour that planed off the stoss side into a long gentle slope. At the right the steep slopes of Cecil Peak rise abruptly from the surface of the lake.

fronted the bulwark of the Eyre Mountains, and, beyond, the gray-black of night and obscurity. The region where the lake turns to take its way to Glenorchy and to Paradise—that spot is dominated by the wonder of all single peaks, the rugged backbone of Ben Lomond, majestic and glorious, piercing alone to the cold of the higher altitudes.

Lake Wakatipu, silent, humble, waiting at the feet of the crowned monarchs, regal in their splendor!—waiting until the resistless action of streams shall cut away the barrier and drain the depression of its lacustrine waters!

Such a night! One of the sparkling points in the eternity of time! A few other nights—a night, as on the little coral island Maka Luva, palm-studded, primitive, and alone, in the midst of the great Pacific; a night, as on the *Makura* preceding the full gale unleashed from the Antarctic; a night, as on the heights at Auckland with the view over Waitemata Harbor to North Head and Devonport, Rangitoto Channel, and the broad slopes of Rangitoto itself; such times that come and go! They are emblazoned forever, as living hours spent in out-of-the-way corners of the earth, on the softly glowing walls, the hidden chambers, of reminiscence.

Under the Light of Day

With the light of another day we stood on the summit of Queenstown Hill rising above the sea some 2,900 feet, a mere step to the towering heights near by. Down below the town nestled on the old beaches of Lake Wakatipu, clear, smooth, sinuous, as it poked in and out of the coves, washing gently the precipitous shores. Far to the right and far to the left it wound until lost in the bosom of the mountains; placid it was, low-set, dragging down as an enormous weight ever pulling on the mountain slopes rounded down to the water's edge.

We were up in a world of snow, a mantle which but served to express the tumultuous sea of range and peak beneath. Far to the east lay a wall of white, the Crown Range whose slopes in summer show tussock-covered rock benches and smoothed surfaces. Northward great undulations swept into The Coronet, the southern terminus of a range of giant mountains, the Macandrew. Across the Shotover gorge to the left a confused mass, out of which rose the triangular form of Bowen's Peak and the cold sharp summit of Ben Lomond buttressed by a knife-like pinnacled ridge, trended

N. Z. Government Publicity Photo

FIG. 4. A byway along the shores of Lake Wakatipu near Queenstown. The trees have been introduced

FIG. 4. A byway along the shores of Lake Wakatipu near Queenstown. The trees have been introduced

N. Z. Government Publicity Photo

FIG. 5. Queenstown and the north end of The Remarkables. Peninsula Hill, which rises between the town and the mountains, shows the grooving action of the ice and the steep lee slope where ice erosion was at a minimum. The outlet of the lake flows to the left just beyond Queenstown.

into the distance as the Richardson Mountains, whose tent-shaped spurs declined step by step to the yawning chasm of the river. The Eyre Mountains, south of the lake's central span, presented in their huge bulk an aspect of subdued grandeur as if a great knife had shorn away all the little rough angles and left a topography of sweeping curves that sloped in a broad arc upward to the summit of Cecil Peak, and plunged down precipitously into the ice-cold waters of Lake Wakatipu. The acme of flowing curves and smoothed contour lay beyond Walter Peak in the rounded dome of Mount Nicholas. And then The Remarkables—more isolated, more lofty, more rugged and riven, more wonderful than ever! The snow-lined walls, seamed and laced by a network of frost and cold, mounted in an overlapping series of gabled ridges to a serrate crest, gaunt and jagged.

In the constant war of the elements very little lowland has resulted. Save for a bit around Queenstown and two or three score square miles eastward from Queenstown Hill the region was a veritable dominion of mountains slashed by narrow *V*-shaped canyons. The diminutive area, The Domain, projecting into the lake; Frankton Flat stretching from the head of Frankton Arm along the outlet of the lake, Kawarau River, and supporting sparse settlements; the Crown Terrace following near the Arrow River; and the Arrow Flat: these comprised the flat or rolling reaches of the district. The valley of the Shotover, separating Richardson Mountains from the Macandrew, was a gaping chasm seldom accessible. The Arrow River, between the Macandrew Mountains and the Crown Range, flowed thru a steep-walled gorge over part of its course. Furthermore, the mountainous tracts were not undulating uplands, rather peaks and ridges that dropped with little fuss and much steepness to lake basin or canyon bottom.

On the top of Queenstown Hill we were *with* the mountains but not *of* the mountains; they held themselves aloof, lifting away, brown grass intermingling with snow until it covered all, swell after swell, crest after crest, in ascending tiers into the dim distance where the sun and snow reign alone thruout the year. Truly a region of snow—a rugged highland!

In the yesterday (Pleistocene or Great Ice Age) of geological time the Wakatipu depression was the "meeting place of giants."*

* The following data are chiefly from the studies of Professor Park.

Great tongues of solid ice covered the lowlands and spread their crushing weights far onto the adjoining uplands. Indeed the glaciers supposedly formed part of a vast ice-sheet that capped the New Zealand of that age.

Yet previous to the Age of Ice—yes, prior to the birth of the mountains themselves—an arm of the ocean penetrated far into the region, since marine sediments of Miocene time outcrop in the

Courtesy of the N. Z. Geological Survey

FIG. 6. A land surface carved by the work of ice, in the Arrow Valley. Ice-shorn whalebacks and roche mountonnees testify to the great pressure exerted by the enormous mass of ice that once moved along the valley. The rock terrace in the distance, rising some 600 to 700 feet above the present valley, represents the floor of the old glacial valley. In the foreground rests a large glacial erratic, dropped by the melting ice as the climate swung back from cold to warm.

drainage area of Few Creek. Long before the gathering of the snows great pressure applied to the crust of the earth threw the rocks into immense folds squeezed so tightly that large fractures developed and permitted the rocks on one side to override those on the other. The intensity of the deformation altered the original sediments of sand and mud into silvery-gray, banded mica-schists. On the newly formed highlands erosion at once began its accustomed task of sculpture and dissection. With increasing cold, icy

tongues preëmpted the valleys and gradually spread far and wide over the landscape. New Zealand was in the hands of the Glacial Period.

Little of the district escaped modification by the crushing mass superimposed on the surface; only here and there a few of the higher peaks reared their heads to the usual freedom of the skies. The evidence of this powerful agent, whether tearing away or

Courtesy of the N. Z. Geological Survey

FIG. 7. Ice-cut benches on the slopes of Ben More near Lake Wakatipu. The remarkable freshness of the grooves indicate how little time comparatively has elapsed since the ice withdrew from the region.

filling up, lies everywhere: channels not followed at present by the streams were chiselled out in the valleys of the Shotover and Arrow; the gorge of Wakatipu was deepened; little basins like those of Moke Lake and Lake Luna lie scattered about; small hills were cut into and smoothed over, as Crag and Tail Hill, Queenstown Hill, and Ferry, Slope, and Morven Hills; the flowing curves of the Eyre Mountains resulted, Mount Nicholas being entirely overridden; and even The Remarkables up to 6,500 feet show the subduing effect of some great instrument of erosion. Everywhere exists the fresh fingerprints of ice-work as the smoothed surfaces,

rounded hummocks, rock terraces (like the giant steps on Crag and Tail across The Domain at Queenstown), striated surfaces, and unduly steepened slopes. Stray boulders lie scattered far and wide and a deep mass of glacial débris blocks the south end of Lake Wakatipu. Queenstown is built partly on morainic rock and The Domain, now a beautiful park, consists of the same material. Patches of till (glacial materials) occur, in fact, almost over the entire region.

The subdued grandeur of a mountain pile, the flowing curves, the plunging slopes, the smoothed and striated surfaces rising and falling in step-like formation, the promiscuous occurrence of débris, owe their present form in large part to the action of the ice. Much of the ruggedness, on the other hand, arose from the work of running water and the influence of the weather after the climate ameliorated and the glaciers melted away. Shotover River has cut an inner gorge several hundred feet into the solid rock and likewise the Arrow has sunk its channel well below that of glacial times. Such in a measure is the amount of time elapsed since the end of the Great Ice Age.

The work of water, ice, and mountain building have so blended their appointed tasks as to give the infinite variety, the natural charm, and the incomparable beauty of the region surrounding Queenstown and The Remarkables.

Toward the close of day we stood well up on the flank of Bowen Peak. A golden glow suffused The Remarkables and tinted the clouds suspended above, an aerial offering to majesty. Down valley in the distance hung a blue-black wall of cloud splashed underneath a crimson hue. Wisps of soft pure white drifted lazily across the larger picture. As the light of day fled westward a faint light from the hidden moon remained to diffuse itself within the veil of clouds. Then it too shrank away and darkness closed round the waiting world. The scenes had shifted; a night and day had dissolved into the ages of history—the ages that wrought with exacting care, with infinite detail, Lake Wakatipu and The Remarkables as we knew them that night and day.

THE GEOGRAPHIC PROVINCES OF ARGENTINA

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GENERAL SETTING

Argentina is the South American republic most like the United States, but consists of only fourteen states and ten territories. It is wedge shaped, broadest at the north, and has a length of 2,285 miles and a maximum width of 930 miles. Superimposed upon the United States in an inverted position, so as to have similar latitudes coincide, the land would extend from the Gulf of Mexico, in the latitude of Tampico to north of Lake Winnepeg. Buenos Aires would be in the position of Memphis. The rainfall would decrease towards the Cordillera the same in both countries. Argentina is inhabited almost entirely by persons of European descent. It has 22,000 miles of railroads, the greatest of any South American country. Its climatic zones and agricultural products are similar to those of the United States. Argentina has not been accurately surveyed .so its area is variously stated by different authorities at from 1,080,000 to 1,154,000 square miles, an area a little larger than the United States east of the Mississippi River. The population in 1914 was 7,905,502 and is estimated at present to be 8,700,000.

GEOGRAPHIC PROVINCES

There has been no general agreement by authorities on the geographic provinces of Argentina. The regional method is one of the best ways of teaching the geography of any country. Especially is this true when one wishes to explain the different industries of the land and the causes for their location. Argentina is still incompletely exploited and developed and its geology and geography is not as thoroly known as that of the United States. Even in our own land authorities disagree as to the boundaries of the physiographic provinces so it is not surprising that the same is true of Argentina.

When a country is separated into geographic provinces, more than one kind of criteria should be used and the boundaries of the

*The writer wishes to express his appreciation for material loaned and other assistance rendered him by Prof. H. W. Haas, of Northwestern University, in the preparation of this article.

divisions should coincide, if possible, with political units in order to better obtain comparative statistics. In determining the subdivisions of Argentina, the topography, climate, agricultural products, and geology were all considered. For ease in grouping statistics, states are wholly included in the provinces where they chiefly belong, altho some really belong in two or more geographic provinces.

STATISTICAL DATA FOR ARGENTINA

ADAPTED FROM SUPPLEMENTARY MAP IN TOBAL'S "LECCIONES DE GEOGRAFIA ARGENTINE"
000 BEING OMITTED FROM EACH COLUMN

PROVINCE	Area Square Miles	Population	Railways Miles	Wheat Acres	Corn Acres	Flax Acres	Oats and Barley Acres	Alfalfa Acres
Pampas	291	5,882	15	16,067	7,761	2,639	3,162	17,414
Patagonia	788	121	1	66	6	....	35	117
Arid and Semi-Arid Interior	440	756	2.4	434	142	....	30	1,544
Northwest Plateaus and Mts.	404	876	2	110	366	....	5	200
Gran Chaco	174	94	0.5	....	32	....	....	57
Mesopotamian Region	198	924	1.5	1,182	406	543	12	608
Totals	2,295	8,653	22	17,859	8,713	3,182	3,244	29,940

PROVINCE	Vines Acres	Fruits Other than Vines Acres	Gardens Acres	Sugar Acres	Rice Acres	Cotton Acres	Tobacco Acres
Pampas	13	1,145	119	...	..	..	..
Patagonia	11	24	7	...	..	..	..
Arid and Semi-Arid Interior	242	68	...	...	..	..	..
Northwest Plateaus and Mountains	5	71	...	89	11	..	5
Gran Chaco	...	5	3	11	..	28	..
Mesopotamian Region	4	209	80	6	4	1	21
Totals	275	1,522	209	106	15	29	26

PROVINCE	Total All Crops Acres	Cattle	Sheep	Goats	Horses	Mules and Asses	Pigs
Pampas	52,151	16,103	24,049	936	5,939	975	2,581
Patagonia	341	433	10,961	494	434	19	18
Arid and Semi-Arid Interior	2,743	1,456	1,291	1,605	561	261	158
Northwest Plateaus and Mountains	1,351	1,952	1,942	1,450	530	281	161
Gran Chaco	106	875	67	54	52	3	17
Mesopotamian Region	3,811	6,232	7,021	44	1,306	41	227
Totals	60,503	27,051	45,331	4,583	8,822	1,580	3,162

The geographic regions of Argentina decided upon are as follows:

1. Patagonia, which includes the territories of Tierra del Fuego, Santa Cruz, Chubut, Rio Negro, and Neuquen, and is divided into a narrow western rainy, forested belt in the Andes, and an eastern semi-arid plateau or plain extending to the Atlantic Ocean. This region is sparsely populated and is chiefly an open sheep range. There is very little farming. Patagonia leads in the number of sheep per inhabitant.

2. Pampas, which includes the states of Buenos Aires, Santa Fe and Cordoba, and the territory of de la Pampa. This is the region of greatest agricultural importance. It leads all others in population and industrial development and has two-thirds of the railroad mileage of the country. It leads in the production of grains and alfalfa, and has the most cattle, sheep, horses, and pigs. The greatest seaports are all in this province.

3. Arid and Semi-arid Interior, composed of the states of San Luis, Mendoza, San Juan, La Rioja and Catamarca, divided into a narrow western Andean area and an eastern plains area. Irrigation is necessary for the growing of fruits and other crops. This province leads in grapes and produces important amounts of other fruits. Grazing is limited and for that reason the number of goats, which are good rustlers, exceed that of sheep and cattle.

4. Northwest Plateaus and Mountains include states of Jujuy, Tucuman, Salta, and the western part of Santiago del Estero, and the territory of Los Andes. This is divided into a dry western mountain area and an eastern upland area having well defined wet and dry seasons. Around Tucuman much rice and sugar are raised. Fruits are important and grains unimportant. The highlands are dry and of little use. Due to lack of fodder goats are as common as sheep, and mules and asses as common as horses.

5. Gran Chaco, which includes the territories of Chaco and Formosa and the northeastern half of the state of Santiago del Estero. This is a land of swamps and forests, of alternate droughts and floods. Most of it is undeveloped and part is unexplored. This region leads in the production of quebracho wood and extract.

6. Mesopotamian Region, so named because of its location between two great rivers, is composed of the states of Entre Rios and Corrientes and the territory of Missiones. It is divided into

a northern region mostly in Missiones, similar to the Brazilian highland, and a southern swampy region with industries similar to the Pampas. The southern part is second to the Pampas in grain, cattle and horses. The northern part is undeveloped, but produces some Paraguay tea and other subtropical products.

7. Western Cordillera, divided into a wet southern and an arid northern section. But this region is quite narrow and does not conform to state boundaries except in the case of Los Andes, and therefore has been included in the preceding provinces with those immediately adjacent to it.

Patagonia

Patagonia is the largest geographic province in Argentina and has the smallest density of population. Its area is about two-sevenths, and its population barely one-seventieth of Argentina's total. Patagonia begins at the Colorado River and extends to Cape Horn. The eastern plains section is semi-arid with a rainfall of 6 to 15 inches annually. There is a narrow belt of quite heavy rainfall in the southern Argentine Andes, and on Tierra del Fuego. The mean annual temperature from north to south varies as much as a change from central Texas to Lake Superior, altho extremes of temperature are rare.

Patagonia rises in a series of great benches roughly parallel with the coast, to an altitude of 3,000 feet at the foot of the Andes. Several broad, deep valleys have been carved by rivers into the nearly flat benches but some of these rivers are nearly dry much of the year. A large part of central Patagonia has interior drainage due to insufficient rainfall. The coastline of Patagonia is bleak and desolate. Harbors are few, and the small ports are mostly at the mouths of rivers. Wave cut cliffs usually rise boldly from the sea to a height of 300 to 500 feet.

Sheep and Wool. There are 45,000,000 sheep in Argentina and the sheep industry is next to that of cattle in importance. Relative to the population, sheep are of most importance in Patagonia where there are nearly 11,000,000 sheep and only 120,000 people. The sheep require no shelter and are grazed in bands of 2,000 to 3,000, each in charge of a shepherd. On the Pampas sheep are often kept in fenced enclosures and the mutton breeds with long wool have been introduced. Nineteen million sheep are in the state of Buenos Aires alone, where there is good natural grazing for them. Since alfalfa does well and more sheep can be kept on

these artificial pastures than the natural ones and cutting of fodder can also be avoided, large flocks of sheep are kept on the cultivated lands. In Patagonia most of the sheep are Merinos which have the advantage of being good rustlers and of herding together well and of producing a good quality of wool, called "criollo" which is very wiry, especially good for mattresses. Merinos are not a large mutton sheep, however. Formerly only the wool and hides were sold, but refrigeration has changed all that. In 1921 Argentina exported 115,000,000 pounds of mutton, being exceeded only by New Zealand, and it also exported 316,484,000 pounds of wool, being exceeded only in this by Australia. The mutton went mostly to Europe, and the wool to Europe and the United States. Argentina should continue to be a great exporter of wool and mutton for many years due to cheap land, favorable climate, abundant forage and closeness of sheep lands to ocean seaports.

Petroleum. The most important mineral resource in Argentina at present is petroleum. A field at Comodoro Rivadavia, on the coast of southern Chubut, has been the only commercial source of oil so far. It is controlled by the government and was discovered in 1907. The annual production is more than 2,000,000 barrels. The oil is low grade and is mostly used for fuel on railroads and the Argentine warships. There are favorable possibilities for oil being found in northwestern Argentina along the foothills of the Andes from Bolivia south to Mendoza. As there is practically no coal in Argentina the finding of more petroleum would be of great benefit to the country, which is at great expense to import coal for railroads and manufacturing.

PAMPAS

The Pampas is the most important geographic province in Argentina. It covers over one-fourth the country and has over two-thirds of the population. The city of Buenos Aires has nearly one-fifth of the entire population of Argentina, and the province of the same name includes one-third the remainder, so that nearly one-half of all the inhabitants are in one city and province.

The Pampas is a flat, grassy and exceedingly fertile plain. The mean annual temperature is similar to Alabama and extremes of temperature are rare. The rainfall is most abundant in the crop growing season and varies from 35 inches on the Rio de la Plata to less than 20 inches in the western part of the district. The Pampas have been formed from fine sediments deposited by water

and wind on a down warped peneplain carved out of igneous and metamorphic rocks. Much of this covering resembles loess. Its character differs from place to place depending on the source of the sediments that form it. The surface is gently undulatory as a result of wind action. Surface streams are few but there are numerous depressions which become lakes in wet weather. The soil is porous and rain readily sinks in. Underground water is therefore abundant and the American windmill is used to pump water for stock, domestic use, and for irrigation in the drier parts.

The chief rivers that have deposited the soil of the Pampas are the two great tributaries of the La Plata, the Parana and the Uruguay. The amount of sediment carried by these two rivers approaches that of the Mississippi. The drainage basin of the La Plata is 1,198,000 square miles, or more than double that of all the Pacific slope of South America.

The coast of Argentina is being eroded by the waves and sand dunes occur quite generally along the shore. Under such conditions, naturally, not very many good harbors could be expected. In fact the only good harbors are the depressions occupied by the estuaries of La Plata and Bahia Blanca.

Agriculture. Agriculture is of quite recent origin in Argentina and is most typically represented in the Pampean section. In all Argentina in 1872 only 2,230 square miles were cultivated; in 1888, 9,500; 1895, 18,800; in 1908, 68,000; and in 1914, 93,500 square miles were in crops. In 1920 there were 94,300 square miles under cultivation of which 81,200 were in the Pampas. The rapid increase in the last thirty years resulted from: (1) rapid railroad construction (there were 4,730 miles in 1888 and 21,000 in 1914); (2) a market for farm products in Europe due to the industrial development; (3) fertile, unexhausted soils; (4) invention of refrigeration permitting the export of fresh meat; (5) favorable climate; (6) flat, easily cultivated land; (7) cheap and abundant immigrant labor. Much of the immigration is of the "swallow" type. Laborers can help harvest crops in both Italy and Argentina due to the different time of harvest and this yearly migration is favored by low steerage rates on steamships. The fact that the land is chiefly held in large estates leads to careless farming by hired help, but causes a greater output of staple crops like wheat. Poor roads, droughts, hot winds, locusts and various plant diseases are common handicaps to the Argentine farmer.

Wheat is the most important crop grown on the Pampas and very little is produced elsewhere except in the southern Mesopotamian Region. In 1919-20, 16,976,000 acres were planted to wheat in Argentina of which only 346,000 were outside the Pampas and Mesopotamian Region. Argentina usually ranks fourth among the nations of the world in wheat acreage, but is about eighth in production due to careless farming. It ranks second in the proportion of cropped land planted to wheat. In 1923-24, Argentina grew about 230,000,000 bushels of wheat. This was not 30 per cent of the United States' crop but the population is so small that about 115,000,000 bushels yearly can be exported, an amount exceeded only by Canada and the United States. Wheat is sown in the fall, from May to July, and is harvested in early summer, December and January. The usual yield is only ten bushels to the acre but the cost of production is low. Wheat is shipped in sacks to terminal elevators at Buenos Aires, Rosario and Bahia Blanca and there loaded automatically on ships. It seems probable that due to better farming methods and increased acreage that in a few years Argentina will produce 300,000,000 bushels of wheat of which 200,000,000 can be exported. Then it will probably take the present place of the United States in wheat exports.

Flax, corn, oats and barley are grown extensively on the Pampas and southern Mesopotamian Region. Argentina produces more than 30,000,000 bushels of flax annually and is the world's largest exporter of flax. Due to a lack of cheap skilled labor it is all grown for grain from which linseed oil is made and no attempt is made to save the fiber from which linen is made in Europe. Corn is a very successful crop in Argentina and is next to wheat in acreage and value of crop. Most of the corn is exported as grain rather than as pork as in the United States so that Argentina is usually the leading corn exporting nation in the world. Its average corn crop is 175,000,000 bushels of which 115,000,000 are exported. Most of this is raised on the Pampas which have a great advantage over the "Corn Belt" in the United States in that they are close to the ocean, with resultant low freight rates to Europe.

Practically one third of the land under cultivation in Argentina is planted to alfalfa. The exact production of hay cannot be given as much of it is pastured instead of being cut for hay. In 1921 out of 19,933,000 acres planted to alfalfa 17,414,000 were in

the Pampas. Most of the rest was in the Semi-arid Interior and Mesopotamian Region. Over much of the Pampas alfalfa needs no irrigation as its long roots penetrate to the ground water and it keeps green and grows well even in dry seasons.

Cattle. The Pampas also leads in livestock. While cattle are found all over Argentina, the greatest number are on the Pampas and Mesopotamian Region where the climate and soil are most favorable. In 1921 in these two districts five sixths of the country's cattle occur on about one third of the total area. In 1921 out of 27,052,000 cattle in Argentina 9,525,000 were in the state of Buenos Aires alone.

Cattle, sheep, and horse raising have been favored by a climate with usually plenty of rain and so mild that no shelter is required, exceedingly fertile soil, and naturally good grasses with no forests to remove. Man has aided these natural factors by inventing refrigeration, developing transportation, and seeding alfalfa. The alfalfa allows two or three times as many animals to graze as the natural herbage. The chief unfavorable factor is occasional drought with resultant lack of food and water for stock use, but the American windmill has helped to provide a water supply.

Argentina's exports of beef since 1911 to the present have averaged nearly one half of the world's exports, of which Great Britain imports the majority. Immense packing plants are located in Buenos Aires and other cities, several of which are owned by United States concerns. Cattle of Spanish origin were early introduced and the original breeds have been greatly improved by the introduction of blooded stock, chiefly Shorthorns and Herefords, and large prices are paid for the best animals. As the cattle are fattened on native grass or alfalfa without grain, and as no shelter is needed and the distance they are shipped by rail is short, they are raised at low cost and Argentina can undersell most of its competitors.

Dairying was unimportant in Argentina until recently. In fact until the war stopped the trade in 1914 the country imported large amounts of cheese from Europe. During the war the lack of foreign competition stimulated domestic production of dairy products, and in recent years an export trade in these has become established and imports are negligible. Probably dairying will continue to grow as Argentina is well suited to it.

Horses and Pigs. There is about one horse for each inhabitant in Argentina and horses are most numerous on the Pampas where the population is largest and requires the most of these animals.

Swine are unimportant in Argentina. Pork production usually accompanies intensive agriculture rather than bonanza farming, and feeding grain to livestock and the marketing of grain crops in the form of meat has not yet become of importance in Argentina. As there is a tendency for large estates to be divided, more diversified farming should result and it seems probable that pork production will gradually become of increasing importance.

Cities. Buenos Aires has a population of about 1,675,000. It is on the Rio de la Plata 130 miles from the sea and the harbor was originally so shallow that boats had to anchor off shore and transfer their cargoes to lighters. Over $35,000,000 has recently been spent on harbor improvements. Great wharves, warehouses and elevators have been built and channels dredged. Boats drawing 22 feet can now enter the harbor. La Plata, 40 miles closer to the sea, can accommodate still larger ships and has grown rapidly of late. Legally it is a part of Buenos Aires. In 1919 Buenos Aires handled 85 per cent of Argentina's imports and 46 per cent of the exports. The city makes over 90 per cent of all the products manufactured in Argentina. The largest factories are great packing houses owned by Chicago packing interests. Buenos Aires is a well built, modern city and resembles a combination of Washington, New York, and Chicago, as it is the national capital, financial center, leading seaport and its manufactures are similar to some of the important ones of Chicago.

Bahia Blanca is 500 miles south of Buenos Aires and is on a naturally better harbor. In 40 years Bahia Blanca has grown from a tiny village to a city of 50,000 and handles 46 per cent of Argentina's exports. This has been brought about by railroads building to Bahia Blanca and providing facilities for exporting grain in bulk and other modern port improvements. Much of the exports of the southern pampas come to Bahia Blanca in preference to the congested port of Buenos Aires. Wheat and wool are its chief exports. Argentina's chief naval base is located close to Bahia Blanca.

Rosario is the second city in size and the third port in importance in Argentina. It is on the Parana River and can be reached by boats of 20 foot draught.

Mesopotamian Region

The Mesopotamian Region of Argentina lies between the Parana and Uruguay rivers. The southern part grows wheat and other crops like the Pampas and its climate and soil are similar. The northern part forms a southern extension of the Brazilian Highlands and has the same subtropical climate and products. Corrientes contains enormous swamps and lagoons, and in the rainy season much of the country is flooded. Between the lagoons the country is quite rolling.

Millions of cattle and sheep graze in the southern Mesopotamian Region and Entre Rios is an important wheat producing state. Corn is grown all over the district. Paraguay tea, the national drink of Argentina, is grown in Missiones, but in insufficient quantities for the nation's needs. Rice, sugar, cotton, and subtropical fruits can be produced in Missiones and as the territory is better developed their production should become important. The handicap of the Mesopotamian Region is the lack of good communication. The Parana is too wide to be bridged and good ferry service was only recently installed.

Water Power. As Argentina has to import all its coal which makes power very expensive, the possibility of developing water power is of great economic importance. The great Iguassu Falls, 230 feet high, on the Iguassu River which forms the boundary between Brazil and northern Missiones, is Argentina's greatest power site. This fall is 800 miles from Buenos Aires, and engineers estimate that a maximum of 325,000 horse power could be generated and recommend a plant which could furnish a minimum of 168,000 horse power at Buenos Aires. The project is believed economically and physically possible, and when financial conditions are favorable will no doubt be carried out. Much power might be developed along the Parana and Uruguay rivers and in the southern Andes. Argentina has probably 5,000,000 horse power available in its water powers. Less than 20,000 is developed now.

Arid and Semi-arid Interior

The Arid and Semi-arid Interior includes about one sixth of the area and one twelfth of the population of Argentina. The drainage is usually interior, and the annual rainfall is between 4 and 20 inches and averages less than 8 inches. The mean annual

temperature is similar to southern Arizona or central California. The province is divided into a narrow Andean mountain belt on the west, and semi-arid plains sloping east from the mountains. Modern alluvial waste from the mountains covers the older bedrock and forms a slope that varies from 3,000 feet altitude at the foot of the Andes to 1,000 feet on the east of the province. Isolated mountain groups rise above this plain and reach heights of 10,000 to 15,000 feet. The Andes culminate in Mount Aconcaqua, 23,000 feet high. The alluvial plains are exceedingly fertile, and swift mountain streams provide the needed water for irrigating the vineyards and orchards for which this region is famous.

Vines. At present the vine is the most important fruit grown in Argentina. The center of the industry is Mendoza and all kinds of grapes are raised. In 1914, 327,400 acres were devoted to the vine, mostly in the states of the Interior. Mendoza produces great quantities of good native wine which is cheap and enjoys a large sale. Olives and peaches, other fruits and nuts are grown extensively in the same region. The greatest difficulty with fruit growing is the lack of a market. Argentina's fruit ripens in our winter. It is therefore to be expected that with improvement of refrigeration or some other method that fresh fruit can be marketed in the United States.

Northwest Plateaus and Mountains

The Northwest Plateaus and Mountains province of Argentina includes about one-seventh of the area and one-tenth of the population of the country. From eastern Salta and Santiago del Estero a hot semi-arid plain rises steadily towards the mountains. The high western mountains and plateaus are quite arid. The temperatures are subtropical like the Imperial Valley in southeastern California and are subject to an extreme range. The drainage is interior and salt lakes and playas are common. Outlying ranges near Tucuman cause a locally increased rainfall of value for irrigation.

Sugar and Tobacco. Sugar cane is grown chiefly in Tucuman where it is the most important crop. In 1915, 296,000 acres were devoted to this crop which was more than all other crops combined. Sugar cane is also raised in Jujuy and Salta, and could be raised in Missiones and Chaco. In Tucuman the cane fields are usually irrigated. The average crop amounts to 200,000 tons and reached

328,000 tons in 1919-20. Argentina generally imports about 100,000 tons of sugar so it would seem that it might profitably grow more of this staple.

Tobacco can be raised in the northern sections of Argentina. Only 28,000,000 pounds of tobacco is produced yearly in Argentina and nearly as much more is imported. Cotton and rice can be grown successfully. Tucuman produces most of the rice. Lack of labor and easy profits in other lines hinder the development of new crops.

Livestock. There are 595,000 mules and 275,000 asses in Argentina compared with 8,823,000 horses. The highest proportion of mules and asses is in the Northwestern Plateaus and Mountains and the Semi-arid Interior where trails are hard for horses and food is scarce. In Los Andes there are nearly 100 mules or asses for each horse. Mules and asses are relatively scarce in the Chaco, Mesopotamian Region, Pampas and Patagonia. There a larger animal is needed and food is plentiful. The state of Buenos Aires has nearly 100 times as many horses as mules or asses.

Minerals. The metallic resources of Argentina occur only in the Andes and outlying ranges. Argentina has never been an important mining country. Some authorities think there has not been much mineralization. Others believe that lack of transportation, fuel and water, high altitude, inexperience of labor, and attractiveness of other forms of investment have been the important factors, and that the future will see a much greater development of the mining industry in Argentina. Gold occurs from Bolivia to Cape Horn but the production is small. Copper, tungsten, silver and lead have been mined to a limited extent, chiefly in Cordoba and Catamarca. Deposits of borax, salt, alum and soda are common in the deserts of northwest Argentina. Considerable lime is produced in the outlying mountains on the Pampas where a market is available in the cities near by.

Gran Chaco

The Gran Chaco of Argentina lies south of the Pilcomayo River. It includes 6 per cent of the country's area with a population of hardly one person per square mile, including Indians. Some of the Indians are still uncivilized and some of the Chaco is still unexplored. The Chaco is a low, nearly level land, and unlike the Pampas, is covered with forests and great swamps. It has well

defined wet and dry seasons. In the summer the temperatures are often extremely hot while in winter freezing temperatures are quite common. Hot winds are often trying as are plagues of locusts and ants. Extreme droughts and abnormal floods may alternate. Heavy rainfall may cause rivers to rise 20 feet above normal and continue so for a year, flooding great areas of the flat land. The forests are largely of quebracho and occur in groves on the higher land not covered by the floods. The soil is all alluvial and no stones whatever can be seen. Many plants and animals not found elsewhere in Argentina exist here.

Forests and Forest Products. One of Argentina's chief imports is timber yet forest products are an important export of the country. The imports are construction materials and wood pulp, and are purchased from the United States and Canada. The exports are chiefly quebracho wood and extract. Nearly 20 per cent of Argentina is forest covered, but, unfortunately, many of these areas are remote from the chief railroads and markets. Argentina's forests are mainly of hard wood. Pine must always be imported.

The Gran Chaco forests are the largest and cover 250,000 square miles in Formosa, Chaco and parts of Santa Fe, Cordoba, Tucuman and Santiago del Estero. This area contains several hard woods of which the quebracho is the most valuable. Quebracho is used for tanning extract, railroad ties, fence posts, street paving and fuel. Both quebracho logs and extract are exported to the United States and Europe for tanning purposes. In 1917 the United States purchased 89,224 tons of logs out of 133,170 tons exported. Quebracho in Spanish means "ax breaker" and the wood is so hard and durable that it will last forty years as railroad ties or fence posts. The total available supply of quebracho wood is estimated at 168,000,000 tons, so the industry can be much increased.

Besides the Chaco, Argentina has considerable forests in the Andes and foothills of western Patagonia. These forests are primarily of the valuable Argentine beech, altho some oak, cedar, larch, Chilean pine and birch occur. The timber occurs in a narrow belt, often only five or ten miles wide, where the rainfall is heaviest. Due to lack of transportation by rail, the absence of navigable rivers and the very poor roads, very few sawmills are at work in the beech forests. Everywhere the methods of lumber-

ing are crude, costly and wasteful, and as much as 60 per cent of the lumber felled is wasted.

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HIGH SCHOOL GEOGRAPHY

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Geography has too long occupied a minor place in commercial education. It has been taught by inexperienced, uninterested teachers whose only thought seems to have been to complete the text in the given length of time. The assignments day after day have been "take pages so and so for tomorrow." The recitations have been usually so uninteresting to both teacher and pupils that all were glad when the class period was over.

If such a subject as geography which links up with life and living is so vitally important to all of us, why are we not finding it interesting? Why is it so neglected? Why do so many teachers hate to teach it and why do academic teachers say to pupils "it is merely a waste of time to take such a course"?

Many people believe that vocational training should only include practical subjects as book-keeping, stenography, spelling and arithmetic. Why limit the education of our boys and girls to the acquisition of proficiency in a few of the tricks and habits of making a living? Such training loses sight of the value of personality, it develops only efficient machines. Industry needs developed personality. Industry must have not alone nimble fingers, nor alone a brain nimble with figures, but a life that has power, has developed initiative, has the desire for growth. The practical and cultural should go side by side and thus give the best possible training for our future business men and women.

Geography is fundamental in the commercial training of those who would enter the industrial life of the world today. Human beings must spend most of their energy in obtaining food, clothing, and shelter. The industries and commerce concerned in the necessaries of life are, therefore, the greatest activities of human life. To the boys and girls who will soon be earning their living, an understanding of economic activities and their relation to natural environment is most important.

The high school course in geography should include physiography, economic geography and human geography. Such a course cannot be completed in one semester. At least two semesters are needed to do satisfactory work and two years would be preferable.

The objectives of the courses in geography are (1) to develop personality, (2) to encourage individuality, (3) to stimulate initiative, (4) to train for leadership.

Methods

Our objectives may be realized by using various methods. Variety stimulates interest.

1. Special reports
2. Problems
   A. Assigned by teacher
   B. Original
3. Make maps illustrating principles
4. Themes
5. Debates
6. Make outlines
7. Follow outlines supplied by teacher

Principles

The principles of geography are so closely related that it is almost impossible to state any one of them without repetition. However, each principle can be brought out clearly by itself.

1. Economic geography touches us on every side. Few realize that the wants of people created industry and commerce, and as our wants increase industry and commerce will increase. In countries or regions where people do not know of things to wish for, there is little industry and commerce. Primitive man got along with such food, clothing, shelter, etc., as he could provide for himself, because he did not know of other things to wish for.

2. Geography is the study of the *adjustments* made by peoples to fit themselves to the best possible advantage into their natural or earth environment. In this study we gain an understanding of what man has done to overcome natural obstacles and learn to appreciate what Nature has done for man.

3. Economic activities are largely determined by natural environment. The chief features of natural environment are climate, soil, topography, geographic position, and natural resources.

   A. Climate affects human energy and vegetation.
   B. Soil affects quality and quantity of crops.
   C. Topography hinders some industries and proves a valuable aid to others.

D. Geographic position is a matter of fundamental importance involving distance and character of intervening areas, especially in their bearing on routes of trade and travel.

E. Natural resources. Mineral deposits encourage development of mining and manufacturing, while forests cause lumbering to be the chief occupation. Large gold deposits draw population.

4. Environment influences man's material needs. In order to understand the economic activities of any country we must study the different peoples, their varying appearance, dress, shelter, kinds of food, and above all their varying capacities for work. In supplying their material needs the people of different parts of the earth generally follow the occupation best suited to their surroundings.

5. Transportation and communication have done more for human progress than any other agencies. Without them we would not have our present civilization. Look at China with its lack of transportation facilities and its undeveloped civilization; just so fast as transportation and communication are developed, so fast will its civilization advance. In our own country, the people of the Southern Appalachian Highlands have been held back by topography which hinders transportation and communication. In some parts of the Highlands, we find habits of life, speech, and thought common in the eighteenth century, a survival of the days when the country was new, when each family or community provided for its own simple wants without depending upon commerce.

6. Many industries and economic activities are influenced by non-geographic factors. Regions able to supply plenty of cheap hand labor can produce raw silk while the United States altho leader in silk manufacturing must import its raw silk. Hand labor is expensive in the United States, while in China, Japan, and India it is very cheap.

7. Agriculture, manufacturing, transportation, etc., are interdependent. Agriculture provides food and raw materials, manufacturing changes the form of materials and gives "form-utility," and transportation carries products to consumer and gives "place utility."

Materials Needed

Reference books

1. Redway, Physical Geography; Huntington and Cushing, Human Geography; Year Books, Department of Agriculture; World Atlas of Commercial Geography by U. S. Geological Survey; International Year Book; Chisholm, Handbook of Commercial Geography; Whitbeck and Finch, Economic Geography; Encyclopedia. To be of value, the reference books must be recent editions.
2. Magazines.
   Journal of Geography, National Geographic Magazine, Economic Geography, American Magazine, Mentor, Travel
3. Atlas
4. Wall Maps
5. Globe
6. Desk outline maps
7. Several good elementary geography texts

An outline for the study of transportation under method seven and a theme on the subject written by a pupil are given in the following pages.

I. Importance of Transportation

1. To civilization
   Without transportation facilities, life would be stripped of virtually all of the conveniences and luxuries which people have come to expect. Transportation facilities are more than mere carriers of freight and passengers. They are the living arteries thru which the life blood of the nations of the world courses.
   Compare United States with some country with fewer transportation facilities.
2. To industrial development
   Gives "place-utility" to productions.
3. In making large cities
   A. Without transportation, there would be no large cities, for with the producers of food cut off from transportation people could not live in a great community.
   B. Largest cities of the world are located beside the sea or on large navigable rivers or lakes. Twenty-three of the forty largest cities in the world can be reached by ocean

steamers, two by steamers on the Great Lakes, and only five of the forty are wholly without water transportation.

C. Inland cities of importance in United States, as Chicago, St. Louis, Detroit
   a. All have water transportation
   b. Good railroads
   c. Motto of St. Louis "Ship from the center, not the rim."

D. Coast cities of United States as New York, New Orleans, San Francisco
   a. Good harbors
   b. Good railroad service
   c. Water-borne commerce of the port of New York is 80 million tons yearly, valued at 4½ million dollars.

II. HISTORY OF TRANSPORTATION

1. Human carriers
2. Water
3. Roads—vehicles
4. Improved waterways
5. Railways

III. MODES IN USE AT PRESENT TIME

1. Beasts of burden
   Of special value where no other transportation is available
2. Water
   A. Ocean
      a. Enables civilizaton and commerce to spread to all parts of the globe
      b. Enables all parts of earth to contribute to one another's support
   B. Rivers. To be of value must be navigable for long distances. Trans-shipment adds greatly to cost of transportation.
   C. Lakes
   D. Canals
      a. Of special importance: Suez, Panama, Soo
3. Rail. Steam, Electricity, Oil
4. Highways. Wagons, Motor Trucks
5. Air

IV. The Relation of Transportation to the Geographical Division of Labor
   1. Specialization of production vs. self-sufficiency
      Only possible thru effective transportation
   2. The transportation problem
      A. High cost of freight hauls has affect on specialization by districts
      B. Costs $650 to haul a carload of low grade lumber from Pacific coast to New York City
      C. An increasing tendency for districts to try to make themselves self-supporting

V. Tests of Efficiency in Transportation
   1. Speed
   2. Cost
   3. Dependability
   4. Organization
   5. Specialization

VI. Costs
   1. Relative cost by various types of carriers
   2. Why ocean transportation costs so little
   3. Rates on inland waterways tend to lower rail rates
   4. Lack of speed on water makes it of less value for transportation of commodities which require speedy delivery
   5. Preferential rates of the different countries and their relation to imports and exports

VII. "Illinois"—Our Own State and Its Transportation

TRANSPORTATION *

LETA FREEMAN

The history of transportation is the history of civilization. All trade depends upon the transportation of goods from one place to another, and has developed with the increase of facilities. The carrying of articles from the place where they are made to a place where they will be more useful is called "place utility." Their value to man is increased, and this added value is just as

* This theme illustrates the reaction of a student to the method of presentation followed by Miss Symonds.—Editor

real as that given by the manufacturers. Transportation service is so highly organized and so cheap that we are hardly conscious of the important part it plays in our daily life.

The largest cities of the world are located by the sea, or on large navigable rivers or lakes. Without transportation there would be no cities, for with the food producers cut off from transportation, people could not live in a large community.

India has suffered from many famines in the last century and a half. During the famine of 1876-79 in China millions of people died from hunger and disease. In both countries food was plentiful, but there was no way by which they could get it to the locality where it was scarce. By this we can readily understand what an important thing transportation really is.

PORTERAGE

The simplest form of transportation is porterage, in which loads are carried by men. Altho it is inefficient and expensive, it increases in amount with the increase of trade. Porterage prevails among savage peoples, in tropical forests and in mountainous countries. In Central Africa Negroes are the chief reliance. About thirty men are required to carry a ton for twenty-five miles a day, and they must be fed. The cost of transportation from the Guinea Coast to Lake Tchad, about six hundred miles, is $360 a ton. The cost on the Uganda Railway for nearly the same distance is ten cents a ton.

PACK ANIMALS

Animals are a great improvement on the human porter, and the horse, dog, ox, camel, yak, llama, elephant, donkey and mule are all used as beasts of burden. Probably the camel is the most efficient, carrying a load up to one thousand pounds. Caravans of 13,000 camels, carrying goods valued at $800,000 cross the Saraha, occupying two years for a round trip. The horse is used in the United States, the dog in the northern countries, and the elephant in the tropical regions.

VEHICLES

Vehicles propelled by man or animal power are the first and simplest of mechanical aids to transportation. The invention of the wheel was a great step in advance, and led to the development

of innumerable vehicles, from the Chinese wheelbarrow to the railroad cars and the auto trucks.

Railways

The use of wheeled vehicles makes necessary the construction of roads, of which the modern railroad is the most highly perfected. An ideal road must be smooth, hard and level. These conditions are more or less fully obtained by grading or cutting down elevations and filling depressions to reduce the slope as much as possible, and by surfacing the road with wood, gravel, stone, brick, asphalt, cement or steel. Rivers and straits are crossed by bridges and tunnels. Mountain barriers are overcome by detours, loops and zigzags to lengthen the line and reduce the slope, and often by a tunnel at the summit. A tunnel under the English Channel is seriously planned, and one under the Bering Strait proposed.

The Rocky Mountains and the Alps are crossed by many railroads, and the Andes by one. The railroad mileage of the world is over 600,000 miles, of which North America has nearly one-half and Europe one-third. The network of railroads is much more dense in eastern United States and western Europe than elsewhere. Belgium and the Netherlands have the greatest density, or the largest mileage per square mile of area. The longest and most numerous railroad lines extend east and west.

The important feature about the English railroad system is its stability. That is the great difference between their railroads and ours. It shows itself in their construction, management and legal relations.

The English railroads were originally built to meet the demands of a community which already enjoyed good roads and canals and insisted on having good and secure railroad service. Money was abundant and it was spent freely. Double track was laid, grade crossings were avoided, and every effort was made to construct the road under a high standard of engineering art.

American railroads, on the other hand, were usually built where existing means of transportation amounted to little or nothing, where capital was scarce, and where speedy and economical construction was more desired than solidity or safety. The question was not what kind of railroads they were to have, but whether they were to have any at all.

Water

Transportation by water is easier and cheaper than by land. Its advantages are that water surfaces are level, or in case of navigable rivers, have a gentle slope. There is usually no expense for construction and maintenance, friction and resistance are small, and vehicles may be very large, and the power required for a given load is less than on land.

Boats of many kinds are in use, from the single log or raft, canoe and rowboat to the modern steamship of 40,000 tons burden, steaming 600 miles a day and burning a ton of coal a mile. The growth of ocean trade has led to the construction of ship canals, of which the Suez and Panama are the most important. The Atlantic Ocean, surrounded by important peoples is most used. The Indian is a connecting link between the Atlantic and the Pacific, and the Pacific is the ocean of the future. Half of the ocean commerce of the world is carried on between Europe and North America, one-eighth between Europe and the Orient and Australia and one-eighth between Europe and Africa.

The St. Lawrence River, with its connecting lakes and canals, furnishes the greatest inland waterway. The great possibilities of the Amazon and the Kongo are as yet little utilized. The Mississippi may regain the trade lost for want of improvement.

To be of value, rivers must be navigable for long distances, as trans-shipment is very expensive. The New Orleans-St. Louis reach of the Mississippi is the only portion of the Mississippi system that is navigable thruout the season. When the Ohio River, Illinois River, and Upper Mississippi River projects are completed to form six to nine feet in depth, boat lines can be established, and lessen the rail haul north of St. Louis, resulting in a still further transportation advantage.

The manufacturing region of northern Europe has the most fully developed transport system in the world. It is a network of canals and the rivers have been improved at great expense. In 1909 the Rhine River carried 58,000,000 tons of freight. The total for Germany of 118,000,000 tons of inland water carried freight was about six times the United States total of 19,000,000 tons.

The civilized world has entered upon an era of water transportation, and the development of water ways is one of the great economic problems of the twentieth century.

Electric Railways

Electric cars came into use about 1890 and rapidly replaced horse-cars. Some freight and express move on electric railroads, but their chief use is for carrying passengers. Their advantage lies in their lower cost as compared with steam railroads, in ease of starting and stopping, and in frequency of service. The approximate cost of starting and stopping a train is one dollar.

Auto

One of the outstanding results of the coming of the auto is the remarkable rapidity with which good roads have been extended. In the United States there are 2,500,000 miles of public roads, of which 12 to 15 per cent consist of surfaced roads. It is beyond question that good roads pay for themselves. On a muddy road it costs about fifty cents to haul a ton a mile with a team and wagon; on a dry dirt road it costs half as much, and with a motor truck on a paved road it costs one fourth as much.

The building of good roads increases the value of the farm land along the route, and reduces the time and cost of transportation.

Air

During the World War, and in the years following, great progress in air navigation was made. The large planes carry from ten to fourteen passengers and eight hundred pounds of mail or goods, and fly from eighty to ninety miles an hour.

Rates for passengers vary greatly, but the established European countries charge from six to ten cents a mile for each passenger. Even then the service does not pay for itself and most of the companies receive government aid. Not much freight is carried for the cost is too high.

THE GREAT WESTERN PLAINS OF NORTH AMERICA

Studies in Regional Geography

(A Questionnaire for the Study of "The Sod House as a Form of Shelter")

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A word of explanation concerning the author's purpose in offering a questionnaire on the Great Western Plains may add to its usefulness. It is intended to illustrate one way of approaching the study of regional geography. As a region, the Great Western Plains form a fairly simple unit. Because of there being no strongly marked outstanding features, the region is likely to receive too little attention. The questionnaire provides for deductive study and assembles material from various sources. Partly for variety, but more on account of opportunities for the application of geographical principles, the pioneer form of shelter, not yet extinct by any means—the sod house—is studied.

The "Sod House as a Form of Shelter" appeared in the *Journal of Geography,* Vol. 14, page 385. It has been reprinted in pamphlet form with map and pages for notes.

This form of house-building is not chosen because of its importance, but because it is a "key" to the climatic conditions of a great natural region. It is an unusually true example of the human response to nature. Literature on the subject is very meager.

1. What area is meant by the Great Western Plains?
2. How extensive are the Great Plains?
3. In what direction do they slope?
4. What is their elevation—minimum, maximum? Consult physical map.
5. What rivers cross the Great Plains?
6. To what drainage system do these rivers belong?
7. How are many of the streams in the Great Plains supplied with water?
8. Where is waterpower developed?
9. What is the rainfall of the Great Plains—minimum, maximum, mean annual? Compare rainfall with that of Wisconsin; Washington state.
10. In what other parts of the world are there extensive grasslands? What names are given to them?
11. Where and what are the Bad Lands of the Great Plains?
12. What are mesas? Buttes? Staked Plains? Sand Hills?

13. Where are the Black Hills?
14. Where is mining carried on? What minerals are mined?
15. What is the leading occupation of the Great Plains?
16. Is the present leading occupation likely to increase or decrease in importance?
17. Where are the towns? Why?
18. Where are the meatpacking centers?
19. How many and what transcontinental railroads cross the Great Plains?
20. In which part of the Great Plains is agriculture being carried on? Why here?
21. What is dry farming?
22. What conditions are favorable for artesian wells?
23. What is the available building material for the homes of pioneer ranchmen? Why? How durable is it? Is this form of shelter increasing or decreasing? What factors determine this change?
24. What determines the location of the ranchman's home?
25. Compare the character of the population on the American Great Plains with that of the Asiatic Steppes (Kirghiz Steppes), as to occupations, antiquity, conservatism, etc.
26. Why were the Great Plains the habitat of the bison, or buffalo?
27. What Indians occupied the Great Plains? How would they differ from the Indians of the Northeast? the Southwest?
28. Where are the caribou and other native herbiverous animals found today? What are prairie dogs? Coyotes?
29. Where are the cattle ranches? The sheep ranches?
30. What provisions did the Kinkaid Act, passed by Congress in 1904, make for free land in the Great Plains?
31. What is the probable future development of the Great Plains?

PROBLEMS

As a problem for study, the pupil may consider this one.

Will the Great Western Plains ever be as densely populated as the Atlantic Coastal Plain? Why?

Of what importance are artesian wells?

Under what conditions would Dry Farming take the place of agriculture by means of irrigation?

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THE NATIONAL COUNCIL MEETING

The annual meeting of the National Council of Geography Teachers will be held at the University of Wisconsin, Madison, Wisconsin, December 28 and 29, 1925. The Park Hotel will be headquarters. Rates are as follows: rooms without bath $1.50 and $2.00 for one person, $2.50 and $3.00 for two persons; rooms with bath $2.00, $2.50, $3.00 for one person, $3.00, $4.00 and $5.00 for two persons.

One or more of the sessions will be given to the presentation and discussion of the reports of the committees that have been working on curricula in geography for the elementary and junior high schools. While a variety of papers will be presented emphasis will be placed upon geography as a social science and geography in the junior high school. The annual banquet will be open to all who reserve a place. More complete details will be given in the December number of the *Journal*.

GEOGRAPHICAL PUBLICATIONS

Vilhjalmur Stefansson. **The Adventure of Wrangel Island.** 424 pp., 1 map, 33 photos. The Macmillan Co., N. Y. 1925. $6.00.

This volume was written with the collaboration of John Irvine Knight upon the diary of whose son, Errol Lorne Knight, the narrative is mainly based. It is a detailed account of the adventure of Wrangel Island. This "adventure" began with the 1913-1914 voyage of the Karluk in which the ship was lost; continues with the ill-fated expedition of 1921, and ends with the relief expedition of 1924. The last was led by Harold Noice who brought back the only survivor—Ada Blackjack, an Eskimo woman, who served as seamstress for the party.

To begin the story Mr. Stefansson outlines briefly the history of the discovery of Wrangel Island and writes of various visits to its shores. It was his firm belief in the importance of Wrangel Island as a great northern air base that caused him to organize the expedition altho he had no definite promise of government aid. It would be absorbingly interesting if it were not so interspersed by controversy over the charges made by Harold Noice against the expedition. To repudiate these charges in an account separate from the story would have made the whole much easier reading.

The fate of the expedition in no way reflects on Mr. Stefansson but it hardly bears out his theory of the "Friendly Arctic." The volume appears to uphold the contention that, if necessary, Wrangel Island can be used as a flying base if men with good health and courage can be secured for the service. However, the recent experiences of both Amundsen and MacMillan cast a shadow on Arctic flying for the present.

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